

APL★PLUS[®]News

Summer 1989

Volume 3, Number 2

Compiled Language Interface Heads List of Features in New APL★PLUS II Release

STSC's newest release of the APL★PLUS II System for the 80386 will be available in the U.S. and Canada in July, and from international dealers in August. Version 2.0 sets new standards of power and ease of use.

Interface Non-APL Programs with $\square NA$

The most important new feature of Version 2.0 is $\square NA$, which allows you to call routines written in compiled languages such as C and to return your results back to APL.

Compiled languages often allow you to perform iterative calculations faster than is possible with APL primitives. They also let you access the libraries of other software packages that provide a high-level language interface.

With $\square NA$, existing subroutine libraries can be interfaced directly from APL. The new function allows you easy access to the wealth of database managers, graphics packages, scientific and financial subroutine libraries, and other software available for the PC.

Effortless Interfacing

One of the difficulties of working with compiled languages is building interactive user interfaces. With $\square NA$, APL is the interface, and it's as easy to call a C routine as it is to call a defined APL function.

To use $\square NA$, you write, compile, and link non-APL routines in the regular way, then use the new system function $\square MLOAD$ to load them into the APL workspace. You use $\square NA$ to describe the routine's parameters to APL. The result is an APL function, called an "associated function," that forms the interface to the routine.

Version 2.0 includes interfaces for several compilers. For the full power of the 80386, you can use the MetaWare[™] High C[™] compiler to write routines that run in the 32-bit protected mode. Or you can use popular industry-standard C compilers like Microsoft[®] C and Borland's Turbo C[®]. Separate, installable interface programs are used to bridge from APL to each compiler. Source code for the interfaces is included, allowing advanced users to build interfaces to other languages.

Editing Numeric Arrays

Another important enhancement is the ability to edit completely numeric arrays as easily as you now edit functions or character arrays in APL★PLUS II. Full-screen numeric editing is fully integrated into the session manager. You can search and replace, cut and paste, use session-manager menus, pull in arrays from the workspace, or select subarrays to save into variables.

More Session Manager Enhancements

The already powerful session manager has been enhanced in Version 2.0 to make it even more productive. A new "Point and Edit" feature allows you to place the cursor on the name of an object that you want to edit. A single keystroke suspends the current session and begins editing the object. You don't even have to type the object's name!

Version 2.0 also lets you:

- customize the terminal emulator in the enhanced *KEYBOARD* workspace to define the precise local behavior for every possible keystroke.
- customize PF Keys by defining them in the configuration file. The definitions remain from session to session.

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New VAX/VMS Release Available This Summer

A summer release date is planned for Version 2.0 of APL*PLUS for the VAX/VMS minicomputer. Many of the enhancements in Version 2.0 were suggested by users at the APL Client Conference last fall.

A highlight of Version 2.0 is improved printer support. Now, you will be able to print APL characters, APL arrays, and native (VMS) files on your Epson FX, HP LaserJet Series II, or LA printer, using the new *PRINTERS* workspace.

Another important enhancement provides graphics capabilities using *WIN* and *IG*-style functions on the PC from APL*PLUS VAX/VMS. This is accomplished through a workspace that provides a closely coupled terminal interface between APL*PLUS II, APL*PLUS PC, and APL*PLUS VAX/VMS. The functions in this workspace will allow you to build graphics applications that use the APL*PLUS System for the PC as an output device.

For prices and information on other enhancements in Version 2.0, call STSC on our toll-free number: 800-592-0050. In Maryland, call 301-984-5123. Outside the U.S., contact your local dealer or call STSC at 301-984-5412.

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- continue to work while the built-in print spooler in the session manager directs other work to the printer.

Tools and Utilities

The new *CONVERT* workspace in Version 2.0 makes it even easier for you to convert from the APL*PLUS System for the PC to APL*PLUS II and back again. It automatically substitutes changes where appropriate and flags lines of code that may need revision. Emulators for *WIN* and the *QPACK* workspace of APL*PLUS PC are provided.

Other features include:

- APL utilities in the *FFT* workspace to generate Fast Fourier Transforms and their inverses.
- an improved *EIGENVAL* workspace to calculate complex eigenvectors.
- a new *HANDLERS* workspace to incorporate reliable error- and interrupt-handling into your applications.
- a new *CODEPAGE* workspace that lets you produce APL characters using the Code Page facilities introduced in DOS 3.30. This

workspace also contains functions that allow you to edit character fonts for EGA and VGA displays.

- new VDI utilities for quick and easy line plots with automatic scaling and labeling.

Virtual Memory Support

APL*PLUS II can now run under the Phar Lap Virtual Memory Manager (available from Phar Lap and various dealers). With virtual memory you can use larger workspaces than would be possible with installed RAM.

APL Language Enhancements

In Version 2.0, derived functions using "each" or "outer product" on non-scalar functions now accept empty arguments instead of producing a *NONCE ERROR* message. APL*PLUS II adapts the definitions used in IBM's APL2 system for this behavior.

For more information on Version 2.0, call STSC on our toll-free number: 800-592-0050. In Maryland call 301-984-5123. Outside the U.S., contact your local dealer or call STSC at 301-984-5412.

STSC Offers APL*PLUS Consulting

Are you looking for custom solutions to your APL applications problems? STSC's Applications Consulting Group provides specialized consulting services that can give you the answers you need.

This group of APL professionals offers consulting and programming services to assist APL users in developing new software applications. For example, they can help you develop new systems, from requirements analysis to completed solutions. For more information, call Steven Promisel, Manager of Applications Consulting, at 301-984-5329.

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APL89 to be Held August 7-10

"APL As a Tool of Thought" is the theme of APL89, the 21st annual international conference on APL. Sponsored by ACM and SIGAPL, the conference will be held at the New York Hilton August 7-10. Between 600 and 1000 attendees are expected.

"This will be a very diverse group," says Chris Lincoln, conference co-chair. "Presenters include array theorists, artists, chemists, astrophysicists, composers, software developers, artificial intelligence experts, and mathematicians. What this diverse group has in common is that they all use APL to model and express ideas, and to visualize solutions to problems."

Speakers from 16 different countries will present invited and contributed papers, panel sessions, short tutorials, and workshops for all levels of APL users, programmers, and managers. There will be opportunities for an informal exchange of ideas at poster sessions and "birds-of-a-feather" discussions. Keynote speeches will feature a variety of prominent APL users. A non-commercial exhibit hall and public-domain software exchange also are planned.

A special pre-conference tutorial day, titled "Statistics for Everyone!" will be held on Sunday, August 6. Conference organizers promise that "no numbers will be mentioned" in the introductory session, which is the nucleus of a new interactive computer text to teach statistics through an APL-based programmed course.

Conference registration is \$375 for members of ACM and SIGAPL, and \$425 for nonmembers. Cost of the tutorial day is \$125 for members and \$150 for nonmembers. For more information, contact APL89 at Post Office Box 4368, Grand Central Station, New York, NY 10163, or call the conference hotline at 212-877-7733 (voice and FAX).

Answers from the Experts

For each issue of APL*PLUS News, staff members of STSC's Client Satisfaction group select questions called in by APL*PLUS users. The questions and their answers will appear in this column as a regular feature.

Q *How do I move my APL array to a DOS file?*

A There are three ways you can move an APL array to a DOS file for importing to dBase, Lotus, and other spreadsheet packages.

If you have the APL*PLUS II System for the 80386 or Version 8.0 of the APL*PLUS System for the PC, you can use the Session Manager to move your arrays. There are five steps.

1. Format the matrix data using a statement like:
`FDATA←⌘DATA`
2. Edit the data using a statement like:
`⋄EDIT FDATA`
3. Press Ctrl-A. The status line displays the prompt
Object type?
along with a series of four choices. Enter "N" to change your object type to native file.
4. In Step 5, you'll create a file with the name "FDATA" (with no extension). If you want to change the name and/or add an extension, press Ctrl-Shift-R and enter the new name/extension.
5. Press Ctrl-E to create the native DOS file.

If you don't have the APL*PLUS II System for the 80386 or Version 8.0 of the APL*PLUS System for the PC, you can use STSC's Spreadsheet Manager. This product provides an interface between APL*PLUS PC and Lotus-compatible worksheets.

Your third option is to execute a series of APL statements to move the data to a DOS file.

1. Create a DOS file using a statement like:
`'DOSfilename' ⋄NCREATE -1`
2. Format the data matrix using a statement like:
`FDATA←⌘DATA`
3. Place carriage-return and linefeed characters at the end of each line. (Most packages require these characters.) For example, you could use:
`FDATA←(FDATA, ⋄TCNL), ⋄TCLF`
4. Move the formatted data to the DOS file using a statement like:
`FDATA ⋄NAPPEND -1`

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5. Append an end-of-file character to the DOS file; for example,

```
'→' □NAPPEND -1
```

6. Untie the DOS file using:

```
□NUNTIE -1
```

Q When using APL*PLUS PC, I'd like to print APL characters on my printer. Can this be done?

A The *PRINTERS* workspace in APL*PLUS PC and APL*PLUS II contains downloadable APL fonts for 14 of the most common printers. The *SELECT* function in this workspace displays a menu of available fonts for these printers.

If your printer is Epson-compatible, but is not listed on the menu, it may work with one of the menu choices.

If these options don't work, your printer may not have enough memory to hold the downloaded font. In this case, use "T=3" (translation for printer output) when you call APL. This should allow you to obtain APL characters on an Epson-compatible printer without using the *PRINTERS* workspace. Printing will be slower than with a downloaded font since you will be printing a graphics image rather than text.

Q How do I move an APL*PLUS PC System workspace to the APL*PLUS II System?

A By way of illustration, assume that subdirectory C:\PC holds the APL*PLUS PC System. If you have Version 1 of APL*PLUS II, follow these steps:

1. Start APL*PLUS PC and load the workspace you want to move:

```
)XLOAD MYPCWS
```

2. You may have to modify some functions before they leave the PC System. At a minimum, you should remove any occurrences of *□HNAMES*, *□HTOPIC*, and *□KEYW* in function headers. To search a workspace for potential adjustments, use the *SCAN* function. For example,

```
)COPY SCAN SCAN  
-1 SCAN ' ;□KEYW'  
)ERASE SCAN
```

finds all localizations of *□KEYW* that need to be edited.

3. Make an APL*PLUS PC file image of the workspace. Copy the *WSTOFILE* function from the *UTILITY* workspace of APL*PLUS PC Release 7 or 8, from APL*PLUS PC TOOLS, or from the *W2FF2W* workspace distributed with APL*PLUS II. Then, run the function in the workspace you want to move.

```
)COPY UTILITY WSTOFILE  
WSTOFILE  
Workspace-file name: MYPCWSWF  
)OFF
```

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Rights for GSS Drivers Now Included with APL★PLUS Run-Time Systems

STSC recently negotiated program redistribution rights with Graphic Software Systems, Inc., to include the GSS drivers in STSC's Run-Time System licenses.

As a result of this agreement, licensed developers who build Run-Time applications for APL*PLUS II or APL*PLUS PC now have worldwide rights to copy and distribute GSS*CGI and/or VDI GSS Drivers with their application programs without an additional charge for the drivers.

STSC's APL*PLUS Run-Time systems allow developers to deliver applications built in APL*PLUS II or APL*PLUS PC without end-users having to purchase a full development system. To encourage the use of the APL*PLUS Run-Time Systems, STSC has assumed the expense of licensing these drivers.

Prior to STSC's recent agreement, developers had to purchase redistribution rights for the GSS Drivers directly from Graphic Software Systems.

For more information on APL*PLUS Run-Time systems, please call STSC toll-free at 800-592-0050. In Maryland, call 301-984-5123. Outside the U.S., contact your local dealer or call STSC at 301-984-5412.

STSC Training Courses Scheduled

Both novice and experienced users can benefit from the APL*PLUS training courses to be offered by STSC in the coming months. Courses will be held in New York City and at STSC's Corporate Training Center in Rockville, Md.

At the request of APL*PLUS users, we will offer six new one-day "workshops" in addition to the more comprehensive four-day training programs. These workshops will allow you to become more proficient in specific areas of APL*PLUS with a minimum investment of time.

In addition to registering for scheduled classes, an increasing number of APL*PLUS users are choosing to hold these courses, as well as customized on-site training sessions, at their own facilities. For complete course descriptions or for more information about on-site options, contact Bonnie Hardy at 301-984-5131.

Courses scheduled include:

Introduction to APL
Four days, \$250/day
August 7-10, Rockville
August 14-17, New York City

Intermediate APL
Four days, \$250/day
July 24-27, Rockville

Introduction to APL for Actuaries
Four days, \$250/day
September 5-8, Rockville

The registration fee for all one-day workshops is \$250. Registrants for the "Spreadsheet Manager" workshop may attend at the regular rate, or may choose a special combination fee of \$375, which includes the APL*PLUS Spreadsheet Manager software. The following one-day workshops will be offered in Rockville in 1989:

How to Write More Efficient APL Code
July 31, November 9

Full Screen Input and Menus - $\square$ WIN
August 22, October 16

Spreadsheet Manager and Data Import/Export Methods
August 23, October 17

Getting Started with the APL*PLUS II System
September 20, November 6

Introduction to Nested Arrays
September 21, November 7

Introduction to $\square$ NA for the APL*PLUS II System
September 22, November 8

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4. Switch to APL*PLUS II, load the *PCFILES* workspace, and immediately rename it so you don't overwrite it by accident:

```
 $\rangle$ LOAD PCFILES  
 $\rangle$ WSID MYIIWS
```

5. Recreate the original workspace from the PC file image as follows:

```
PRIOR $\leftarrow$  $\square$ NL 2 3  
'C:\PC\MYPCWSWF' FTIE 88  
PCFILETOWS 88  
'C:\PC\MYPCWSWF' FERASE 88
```

6. Edit out of *PRIOR* any names of objects that appear in your imported workspace, and erase extraneous objects left over from *PCFILES*:

```
 $\rangle$ EDIT PRIOR  
 $\square$ ERASE PRIOR  
 $\square$ ERASE 'PRIOR'
```

7. Save your new workspace:

```
 $\rangle$ PSAVE MYIIWS
```

8. You may need to adjust the code moved to APL*PLUS II and re-save the workspace. Be sure that you search for occurrences of $\square$ CALL; any such usage must be replaced by an equivalent on APL*PLUS II. Other adjustments are likely to be needed in the areas of peeks, pokes, and keystroke events. Refer to Appendix D of the *APL*PLUS II Reference Manual* for a discussion of system differences.

The *SCAN* function (from the APL*PLUS II *UTILITY* workspace) can help you search the workspace. For example,

```
 $\rangle$ COPY UTILITY SCAN  
-1 SCAN ' $\square$ P $\square$ n $\square$ '
```

locates all system functions and variables beginning with " $\square$ P" ($\square$ PEEK, $\square$ POKE, $\square$ PFKEY, and so on) that need to be examined before you run your imported workspace.

If you have Version 2 of APL*PLUS II, you can shortcut several of these steps by using the *LOADPC* function from the *CONVERT* workspace. Omit Step 2 and replace Steps 4 to 8 with the following:

Switch to APL*PLUS II, load the *CONVERT* workspace, and run the *LOADPC* function:

```
 $\rangle$ LOAD CONVERT  
LOADPC 'C:\PC\MYPCWSWF'
```

This step incorporates a comprehensive examination of the source workspace for adjustment sites, and automatically saves the imported workspace (after prompting for the workspace name).

Client Satisfaction Group

Aims for Improved Response Time, Personal Touch

In January, STSC set a new standard for client service, with the inauguration of its Client Satisfaction group. This group is dedicated to answering clients' questions about all of STSC's products.

Judith Gallop, Director of Client Satisfaction, states: "Our task is straightforward, but challenging: to ensure clients' ongoing satisfaction through even better service. Our goal is to answer all calls promptly, and to minimize the number of call-backs required. We want to give clients the information they need, when they need it."

This is no mean feat for a team that must answer hundreds of calls a day. However, the group has risen to the challenge. Currently, 99 percent of calls are being personally answered by a Client Services representative. The goal is 100 percent.

APL *PLUS users who call STSC will find all the members of the Client Satisfaction group ready and able to answer—or quickly find someone else to answer—their questions. Please call if, after checking the documentation:

- you still have problems loading the software
- you think the software behavior is inconsistent with the documentation
- you suspect there is an error in the software.

To reach the Client Services staff, APL *PLUS PC and APL *PLUS II users should call 301-984-5489 between 10:00 a.m. and 5:30 p.m. (Eastern time). Mainframe, UNIX, and VAX/VMS system users should call 301-984-5160 between 9:00 a.m. and 5:30 p.m.

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